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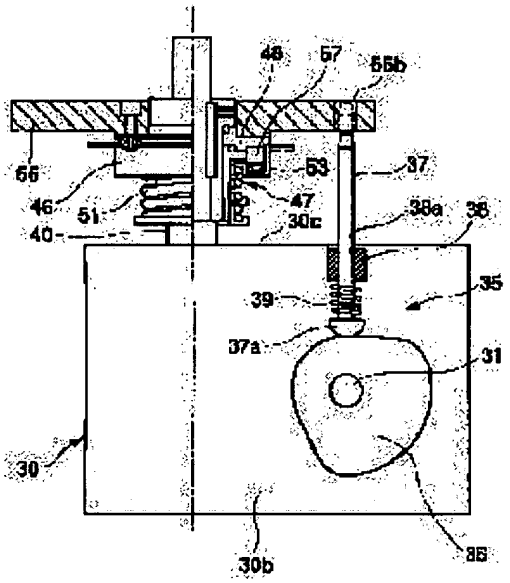
(54) INTERMITTENCE DIVIDING DEVICE

(57)Abstract:
PURPOSE: To provide an intermittence dividing device in which intermittence dividing motion can be obtained from rotational motion in its reasonable structure by the use of cam mechanisms and a clutch means, and basides, in which high accurate dividing performance can be secured.
CONSTITUTION: An intermittence dividing device is provided with a first cam mechanism which converts the rotational motion of an input rotary shaft 31 into intermittent oscillating motion having a stationary period, a second cam mechanism 35 which converts the rotational motion of the input rotary shaft 31 into reciprocating motion generated during the stationary period, an output shaft 40 to which the oscillationg motion of the first cam mechanism is transmitted, a cylindrical body 47 provided at the output shaft 40, and a disc 48 which can be relatively rotated against the cylindrical body 47. The intermittence dividing device is also provided with a clutch device 46 which is intermittently operated according to a load generated between these cylindrical body 47 and disc 48, and a rod body 37 to which the reciprocating motion of the second cam mechanism 35 is transmitted, and which is engaged to be freely engaged/ disengaged with/from a table 55 attached to the disc 48 of the clutch device 46 so that the clutch device 46 is intermittently operated.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] Intermittent indexing equipment characterized by providing the following The 1st cam mechanism which changes rotation of the input axis of rotation into intermittent oscillation movement which has a stay period The 2nd cam mechanism which changes rotation of the above-mentioned input axis of rotation into reciprocating movement produced in the above-mentioned stay period The output shaft which the above-mentioned oscillation movement of the 1st cam mechanism of the above is delivered the input prepared in this output shaft -- a member and this input member -- receiving -- the output member in which relative rotation is possible -- having -- close [these] and an output -- a member -- the clutch means which is intermittent according to the load generated in between, and a clutch operation means the above-mentioned reciprocating movement of the 2nd cam mechanism of the above is transmitted, engage with the above-mentioned output member of the above-mentioned clutch means free [engaging and releasing], and carry out the intermittence operation of this clutch means
[Claim 2] The 2nd cam mechanism of the above is intermittent indexing equipment according to claim 1 characterized by transmitting one movement of advance movement for the engagement to the aforementioned output member of the aforementioned clutch means, and the retreat movements for secession to the aforementioned clutch operation means by turns to each aforementioned stay period generated intermittently one by one.
[Claim 3] Intermittent indexing equipment according to claim 1 or 2 characterized by carrying out intermittent rotation of the aforementioned output member at the same time it makes intermittent oscillation movement output from the aforementioned output shaft.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention can relate to intermittent indexing equipment, especially can obtain intermittent indexing movement from rotation with rational composition using a cam mechanism and a clutch means, and relates to the intermittent indexing equipment which can moreover secure a highly precise indexing performance.
[0002]
[Description of the Prior Art] As a mechanism which generates intermittent rotation from rotation, the technology adopted as the roll feed is known in securing intermittent indexing movement conventionally. Fundamentally, as shown in drawing 8 and drawing 9 , this roll feed By carrying out the intermittent rotation drive of one roll 1 among the rolls 1 and 2 of a couple which changed rotation into oscillation movement (repetitive rocking rotation), and changed this oscillation movement into intermittent rotation further, it was made to carry out phase opposite mutually, and were installed The operation which sends out a web material 3 to ** intermittently on the other hand between the rolls 2 of another side is obtained.
[0003] If it furthermore explains in full detail, the rolls 1 and 2 of a couple are formed by each in the shape of a cylinder object, those periphery cylinder sides separate the crevice between some, and they are installed so that phase opposite may be carried out. Especially And on the other hand, the sleeve 4 outside the shape of a hollow cylinder object by which the 1st roll 1 is arranged outside and phase opposite is carried out with the 2nd roll 2 of another side, It consists of inner sleeves 5 arranged in the interior of the outside [this] sleeve 4 on this and the same axle. between these inside sleeve 5 and the outside sleeve 4 You make it located in those both-ends side, only the 1 direction rotation of the inner sleeve 5 is transmitted, and couple interposition of the one-way clutch 6 which intercepts return rotation of opposite direction is carried out. Furthermore, the inner sleeve 5 is made to extend from the shaft-orientations both ends to a way outside the outside sleeve 4, the shank 7 of a couple is formed in it, and these shanks 7 are supported free [rotation] by bearing 8, respectively. And the other end of the swinging arm 9 mentioned later is connected with the axis end section of one shank 7 in one. On the other hand, the brake gear 12 which consists of a brake drum 10 and a shoe 11 which brakes this is formed in the shaft-orientations end section of the outside sleeve 4. In addition, the shank 13 of a couple extends from the shaft-orientations both ends, free [rotation by bearing 14] for both the shanks 13 of these couples, when elastically supported by the suspension mechanism 15, the 2nd roll 2 separates a crevice to the 1st roll 1, and the elastic support of the rotation of it is made free.
[0004] Thus, the transfer mechanism in which movement is inputted to the constituted rolls 1 and 2 is constituted as follows. 16 is the input axis of rotation by which a rotation drive is carried out on the other hand at **, the crank 17 in which the end is connected in one and circles to this input axis of rotation 16 synchronizing with the input axis of rotation 16 is formed, the end of a connecting rod 18 is connected with the other end of this crank 17 free [rotation], and the end of a swinging arm 9 is connected with the other end of this connecting rod 18 free [rotation]. And the other end of this swinging arm 9 is connected with one shank 7 of the 1st roll 1 equipped with the one-way clutch 6 and brake gear 12 which were mentioned above in one.
[0005] ** [explanation of operation of the above roll feed / change / as everyone knows / the link frame formation of a crank 17, a connecting rod 18, and a swinging arm 9 / rotation of the input axis of rotation 16 / into oscillation movement which carries out both-way rocking rotation of the swinging arm 9 continuously in the fixed rocking angle range] By continuous oscillation movement of this swinging arm 9, the inner sleeve 5 of the 1st roll 1 connected with this will perform oscillation movement continuously in the angle-of-rotation range corresponding to the rocking angle range of a swinging arm 9. While an one-way clutch 6 repeats transfer and interception of movement, namely, 1 direction rotation of the inner sleeve 5 is transmitted to the outside sleeve 4 to oscillation movement of such an inner sleeve 5 Intercepting transfer to a sleeve 4 outside return rotation, the outside sleeve 4 will perform intermittent

rotation to the one direction of the inner sleeve 5 that the inside of the Mukai turnover period rotates to ** on the other hand, and on the other hand the inside of a return turnover period stops, as a result. Under the present circumstances, 1 time of the amount of sends of the web material 3 which is put between a sleeve 4 and the 2nd roll 2 outside the 1st roll 1, and is sent out will be governed by 1 time of angle of rotation in intermittent rotation of the outside sleeve 4.
[0006] By the way, transmitting only the 1 direction rotation of the inner sleeve 5 has an operation of the one-way clutch 6 to the outside sleeve 4, during a return rotation period, since the outside sleeve 4 is rotation freedom, if it does not prevent the free rotation of the outside sleeve 4 in this return turnover period, a web material 3 will be returned by the free rotation of the outside sleeve 4, or will be sent out, and there is a possibility of changing the amount of sends of the web material 3 concerned. Then, it is made to always give braking with a brake gear 12 to the outside sleeve 4. namely, in case a brake gear 12 is controlled to always generate damping force and rotation of the inner sleeve 5 is transmitted to the outside sleeve 4 through an one-way clutch 6 The inner sleeve 5 overcomes the brake gear 12 which is braking the outside sleeve 4, and this is rotated. moreover, in case another side and the inner sleeve 5 return, it rotates and the inner sleeve 5 and the outside sleeve 4 are separated by the one-way clutch 6 As the free rotation of the outside sleeve 4 is prevented with a brake gear 12, itis [regularity-] made toize the amount of sends of a web material 3 by such operation.
[0007]
[Problem(s) to be Solved by the Invention] By the way, the following technical problems occurred by the conventional mechanism in which have movement conversion composition which was mentioned above and intermittent rotation is acquired from rotation.
[0008] First, although it is made to prevent the free rotation of the outside sleeve 4 with a brake gear 12 in the 1st roll 1 about the mechanism in which oscillation movement of the inner sleeve 5 is changed into intermittent rotation of the outside sleeve 4 in order to realize this In case the 1 direction rotation of the inner sleeve 5 is transmitted to the outside sleeve 4 and it is made to rotate, in order for this brake gear 12 to brake this and to rotate the outside sleeve 5 in such the state, it must resist damping force and must carry out the rotation drive of the outside sleeve 4. For this reason, there is a problem that the life of a brake gear 12 is short and a maintenance is needed within a short period of time. Moreover, although the brake gear 12 did not reach the life, the secular change of stop ability arise unescapable by the wear etc., and it was easy to produce an operation error in the movement transfer path from the inner sleeve 5 to the outside sleeve 4 from this field, therefore it could not guarantee intermittent rotation in the fixed angle range of the outside sleeve 4 as a result, but also had the problem that it was difficult to obtain a positive motion.
[0009] In order to cope with problems, such as such endurance, taking timing with return rotation of the inner sleeve 5, and during the period when the outside sleeve 4 serves as rotation freedom operating a brake gear 12, and braking the outside sleeve 4 is also considered. However, in the case of braking operation of a brake gear 12, or release operation, there is rotational inertia in the outside sleeve 4, and there is [though small the outside sleeve 4 turns, or] a possibility that it may be turned, by friction operation etc., and it becomes difficult by unescapable generating of the angle-of-rotation error of the outside sleeve 4 in accordance with the operation to acquire intermittent rotation of the outside sleeve 4 in the positive fixed angle-of-rotation range in the view which operates a brake gear 12 in this way. And such an error becomes so large that the outer diameter of the 1st roll 1 becomes large (i.e., so that the scale of an output side becomes large), and utilization becomes difficult.
[0010] Furthermore, in order to prevent the surroundings of the 1st roll 1 accompanying braking / release operation of such a brake gear 12, enlarging mass of the 1st roll 1 concerned is considered, and there is also a problem that enlargement and large weight-ization of the whole equipment will be invited by this.
[0011] Furthermore, the movement transfer mechanism which consists of a crank 17, a connecting rod 18, and a swinging arm 9 was impossible, and being able to obtain only oscillation movement of the angle range of less than 180 degrees from the maximum top dead center to a bottom dead point, therefore obtaining oscillation movement of the angle range beyond it as everyone knows, and transmitting this to the 1st roll 1 was not able to secure arbitrary sufficient amounts of sheet sends.
[0012] in addition, if it carries out with an above-mentioned mechanism that this should be coped with to secure the big amount of sheet sends, the outer diameter of the 1st roll 1 is not enlarged -- it cannot undertake but obliged to enlargement and large weight-ization of equipment as a result
[0013] this invention is originated in view of the conventional technical problem which was mentioned above, and using a cam mechanism and a clutch means, the purpose can obtain intermittent indexing movement from rotation with rational composition, and is to offer the intermittent indexing equipment which can moreover secure a highly precise indexing performance.
[0014]
[Means for Solving the Problem] The 1st cam mechanism from which the intermittent indexing equipment concerning

this invention changes rotation of the input axis of rotation into intermittent oscillation movement which has a stay period, The 2nd cam mechanism which changes rotation of the above-mentioned input axis of rotation into reciprocating movement produced in the above-mentioned stay period, It has the output member in which relative rotation is possible to a member and this input member. the input prepared in the output shaft which the above-mentioned oscillation movement of the 1st cam mechanism of the above is delivered, and this output shaft -- close [these] and an output -- a member -- with the clutch means which is intermittent according to the load generated in between It is characterized by having transmitted the above-mentioned reciprocating movement of the 2nd cam mechanism of the above, having engaged with the above-mentioned output member of the above-mentioned clutch means free [engaging and releasing], and having a clutch operation means to carry out the intermittence operation of this clutch means.

[0015] Moreover, the 2nd cam mechanism of the above is characterized by transmitting one movement of advance movement for the engagement to the aforementioned output member of the aforementioned clutch means, and the retreat movements for secession to the aforementioned clutch operation means by turns to each aforementioned stay period generated intermittently one by one.

[0016] Furthermore, it is characterized by carrying out intermittent rotation of the aforementioned output member at the same time it makes intermittent oscillation movement output from the aforementioned output shaft.

[0017]

[Function] If an operation of invention concerning a claim 1 is explained, rotation of the input axis of rotation will be changed into reciprocating movement performed by the 2nd cam mechanism during the stay of oscillation movement in the 1st cam mechanism at the same time it is changed into intermittent oscillation movement which has a stay period by the 1st cam mechanism. That is, after rotating in rotation inputted from the input axis of rotation by fixed rocking angle of rotation which is in ** on the other hand, it stops during a certain fixed period, and the 1st cam mechanism outputs intermittent oscillation movement of stopping during a fixed period which exists further, after performing rotation which returns in the direction of a retroversion pair. On the other hand, the 2nd cam mechanism outputs reciprocating movement of stopping during a certain fixed period after performing movement which advances to ** on the other hand at least in rotation of the same input axis of rotation in one which the 1st cam mechanism makes of stay periods, and stopping during a fixed period which is after performing movement which retreats to opposite direction at least in one stay period of subsequent. That is, the 2nd cam mechanism will produce reciprocating movement which moves in the any 1 direction at least during [one] the stay of the 1st cam mechanism.

[0018] The clutch means by which intermittence control is carried out is prepared in the output shaft which oscillation movement is delivered from the 1st cam mechanism of the above. the input member by which this clutch means was prepared in the output shaft, and this input member -- receiving -- the output member in which relative rotation is possible -- having -- **** -- close [these] and an output -- a member -- the load generated in between -- responding -- namely, -- time a load is small -- close and an output member -- one -- connecting -- time another side and a load are large -- both -- separating -- an output -- the relative rotation to the input member of a member is permitted Therefore, this clutch means rotates an input member and an output member according to rotation of an output shaft, when [both] a load is small, and when another side and a load are large, it rotates an output member relatively to the input member rotated according to an output shaft.

[0019] thus, the intermittence operation is carried out to the clutch means which operates -- it should make -- close [its] and output -- a member -- operation which controls the load of a between is performed by the 2nd above-mentioned cam mechanism Engaging and releasing of a clutch operation means by which the reciprocating movement is transmitted is enabled from the 2nd cam mechanism to the output member of a clutch means. And it is the stay period of the 1st cam mechanism, and by the 2nd cam mechanism which outputs reciprocating movement when the output shaft has stopped, therefore the output member of a clutch means has stopped, a clutch operation means is engaged to the output member concerned, or it secedes from it. And while the clutch operation means is engaging with the output member by the 2nd the movement transfer and its halt from a cam mechanism, the rotation is controlled by the clutch operation means even if an output member tends to rotate with an output shaft by resumption of oscillation movement of the 1st cam mechanism. A big load can be generated between an input member and an output member, and a clutch means is separated by this inhibition operation. While an input member rotates with an output shaft, the relative rotation to an input member is permitted by cutting of this clutch means, and an output member becomes [being controlled with as, and] by it. On the other hand, when the clutch operation means has seceded from the output member by the 2nd the movement transfer and its halt from a cam mechanism, there is no generating of the load by the clutch operation means between an output member and an input member, therefore a clutch means will be in a connection state. In the connection state of this clutch means, an output member will be rotated with an input member or an output shaft by resumption of oscillation movement of the 1st cam mechanism at rocking angle of rotation of the

1st cam mechanism.

[0020] Thus, while an output shaft continues oscillation movement transmitted from the 1st cam mechanism, an output member will repeat inhibition operation and rotation operation, and will be carried out [intermittent rotation] by this by intermittence control of the clutch means by the clutch operation means. And by the cam curve of the 1st cam mechanism, and clutch operation means to drive to the 2nd cam mechanism, to engage with an output member, and to make this control, position indexing in the case of this intermittent rotation will be secured exactly, and, thereby, can obtain intermittent indexing movement of a positive motion.

[0021] Namely, the intermittent indexing equipment of this invention is constituted using a machine element called the cam mechanism which can create a positive stay state and can obtain the positive motion of the whole movement easily and certainly by the dwell fundamentally. Intermittent rotation is taken out from intermittent oscillation movement obtained by this cam mechanism by intermittence of the clutch means controlled by the clutch operation means. In this intermittent rotation, it deduces in engagement operation to the output member of a clutch operation means further, a position is held, and intermittent indexing movement of a positive motion can be rationally obtained with high degree of accuracy.

[0022] And the short machine element of the term of a guarantee of operation like the brake gear in the former can be eliminated, a mechanism can be constituted, and maintenance-free equipment can be obtained.

[0023] moreover, an output -- the output in which the position indexing precision of a member was essentially secured in a high precision by the cam curve with which a cam mechanism is equipped, and position indexing was further carried out by this cam mechanism -- the surroundings with an unnecessary member can be completely prevented by the clutch operation means Therefore, the influence of the secular change in the brake gear used in order to make indexing operation certain in the conventional mechanism can be eliminated, and positive-motion operation by which precision was stabilized extremely highly can be guaranteed semipermanently.

[0024] moreover, the rocking angle-of-rotation range of oscillation movement with the cam curve in a cam mechanism -- a limit -- there is nothing -- therefore, oscillation movement of the angle range of 180 degrees or more -- ******** -- things are also made

[0025] Moreover, when an operation of invention concerning a claim 2 is explained, the 2nd cam mechanism makes a clutch operation means accept and exercise in the any 1 direction of advance and retreat by turns to the stay period of each time of the 1st cam mechanism on the assumption that movement of the 1st cam mechanism in invention concerning the above-mentioned claim 1, and the 2nd cam mechanism. In short, on the other hand, it rotates to **, and the 2nd cam mechanism outputs reciprocating movement of making a clutch operation means marching out and surely retreating it during the stay after ******, in the stay period after ****** to oscillation movement of the 1st cam mechanism of returning again.

[0026] Specifically, on the other hand, the 1st cam mechanism rotates to ** first. At this time, the clutch means is connected and an output member rotates by the output shaft with an input member. It stops during a certain fixed period after that. During [this] the stay, on the other hand, the 2nd cam mechanism makes a clutch operation means advance to **, is made to engage with an output member, and stops during a fixed period in the state. In the state of such engagement, the 1st cam mechanism will perform after that rotation which returns to the following opposite direction. In the case of this return rotation, a clutch means is separated by generating of the load by the clutch operation means, and while an input member returns and rotates with an output shaft, an output member is controlled. Then, during the stay of the 1st next cam mechanism, the 2nd cam mechanism retreats a clutch operation means to opposite direction contrary to last time, is made to secede from an output member, and stops during a fixed period in the state. A clutch means will be in a connection state by this, and an output member will rotate with an output shaft in the case of rotation to the one direction of the 1st subsequent cam mechanism. And this movement will be repeated repetitively.

[0027] That is, intermittent rotation to the one direction of the 1st cam mechanism of having rotated by connection of a clutch means by rocking angle of rotation with an output member fixed to an output shaft and one at the time of rotation to **, and on the other hand having stopped by the stay period of the 1st cam mechanism and cutting of a clutch means during the other period will be performed, and intermittent indexing movement will be obtained by this. moreover, this time -- an output shaft -- an output -- according to oscillation movement of the 1st cam mechanism, it exercises separately from movement of a member

[0028] If an operation of invention of a claim 3 is furthermore explained, an output shaft can always perform oscillation movement according to movement of the 1st cam mechanism, and an output member can perform intermittent rotation according to intermittence control of a clutch means simultaneously with it, and two kinds of these movements can be made to output on the same axle from the single input axis of rotation and an output shaft, as mentioned above.

[0029]
[Example] The suitable example of this invention is explained in full detail according to an accompanying drawing below. The intermittent indexing equipment concerning this example is shown in drawing 1 - drawing 4 . 30 is hollow box-like housing, phase opposite is carried out from the unilateral wall 30a, and also cover side-attachment-wall 30b, it is made to penetrate in this housing 30 horizontally, and the input axis of rotation 31 is formed in it. This input axis of rotation 31 is supported by these side attachment walls 30a and 30b of housing 30 free [rotation] through bearing etc., and, on the other hand, a rotation drive is carried out by driving sources, such as a motor, at **.
[0030] In the housing 30 interior, the 1st cam mechanism 32 is formed in this input axis of rotation 31. This 1st cam mechanism 32 consists of a rocking rotating cam 33 used as the driver fixed to the input axis of rotation 31, and a turret 34 used as the follower of this rocking rotating cam 33, as shown in drawing 1 and drawing 5 . If it is in this example, the so-called roller-gear cam 33 is adopted as a rocking rotating cam. One taper rib 33a is formed in the periphery front face of the circumference of the input axis of rotation 31 along with the hoop direction, rib side 33b of a couple is formed in the both-sides wall of this taper rib 33a, and these rib side 33b is constituted as a slide contact side of roller 34a by this roller-gear cam 33.
[0031] On the other hand, from this, a turret 34 is made to project toward the taper rib 33a side of the roller-gear cam 33, respectively, and roller 34a of a couple is prepared in it. rib side 33b of the couple which these roller 34a was attached in the turret 34 free [rotation], and was formed in the roller-gear cam 33 -- it is alike, respectively and ****s free [sliding rotation] And it shows around being restrained by taper rib 33a, and is moved along with the cam curve created by taper rib 33a at the roller-gear cam 33, and these roller 34a is constituted so that oscillation movement of the turret 34 may be carried out according to this movement.
[0032] As shown in drawing 6 , specifically for the roller-gear cam 33 as a rocking rotating cam Make it circle in a turret 34 according to the increase in the angle of rotation with rotation of the input axis of rotation 31, and it is made to rotate to the arbitrary revolution angles alpha. After that, by the dwell, stop a turret 34 during a fixed period, and according to the increase in the angle of rotation of the input axis of rotation 31, make it circle in the direction of return, and a turret 34 is further returned and rotated to 0 degree of revolution angles. The cam curve which stops a turret 34 during a fixed period by the dwell again after that is formed. In the period of 360-degree 1 rotation of the input axis of rotation 31 in this example Rotate a turret 34 to the revolution angle alpha first in 90 degrees, and a turret 34 is stopped in [subsequent] 180 degrees. A turret 34 is returned and rotated to 0 degree of revolution angles in [subsequent] 270 degrees. The cam curve is set up so that operation which furthermore stops a turret 34 in [subsequent] 360 degrees, and rotates a turret 34 to the revolution angle alpha again by rotation of the subsequent input axis of rotation 31 may be repeated. That is, the 1st cam mechanism 32 is constituted so that rotation of the input axis of rotation 31 may be changed into intermittent oscillation movement which has a stay period.
[0033] Since the structure which consists of taper rib 33a of the roller-gear cam 33 especially adopted by this example and roller 34a is moreover pre-load structure with the restrained type, it does not have backlash, its rigidity is high, it is suitable for the high-speed drive, and especially desirable as a cam for a drive of indexing equipment. However, of course [without being limited to the above-mentioned roller-gear cam 33] as the 1st cam mechanism 32, you may apply which cams, such as other plane cams and solid cams, for example, a plate cam, a grooved cam, an end cam, a cylinder rib cam, a cylinder grooved cam, a cone end cam, a cone grooved cam, a barrel-shape grooved cam, and a hard drum form grooved cam.
[0034] On the other hand, as shown in drawing 2 - drawing 4 , the 2nd cam mechanism 35 is formed in the edge which extended to the way outside housing 30 at the above-mentioned input axis of rotation 31. At this example, as the 2nd cam mechanism 35, it is attached in the input axis of rotation 31, and consists of this, a vertical-movement cam 36 as a driver rotated in one, and a rod object 37 as a follower driven along with the cam curve created by this vertical-movement cam 36. If it is in this example, the plate cam 36 is adopted as a vertical-movement cam. the guide to which the rod object 37 protruded on side-attachment-wall 30b of housing 30 horizontally from this -- it is inserted in in longitudinal hole 38a currently formed in the member 38, and the vertical round trip movement is guided Spherical section 37a is formed in the soffit which attends a plate cam 36 side, and this rod object 37 is contacted by the plate cam 36 free [sliding] by this spherical section 37a. moreover -- while the circumference is surrounded on the rod object 37 -- the flat side on the rear face of spherical section 37a, and a guide -- it is put between the soffit sides of a member 38, and the plate cam 36 is equipped with the coil spring 39 which carries out press energization in the rod object 37 concerned And it is moved along with the cam curve created by the plate cam 36, and this rod object 37 is constituted so that reciprocating movement may be carried out according to this movement.
[0035] As shown in drawing 6 , specifically to the plate cam 36 as a vertical-movement cam According to a dwell, the rod object 37 is stopped during a fixed period at first with rotation of the input axis of rotation 31. According to the increase in a subsequent angle of rotation, advance movement of the rod object 37 is carried out upwards in the

predetermined amount beta of displacement, after that, further, the rod object 37 is stopped during a fixed period by the dwell, and the cam curve which carries out retreat movement of the rod object 37 to a lower part to the position of the amount 0 of displacement according to the increase in an angle of rotation again after that is formed. In the period of 360-degree 1 rotation of the input axis of rotation 31 in this example First in 90 degrees, stop the rod object 37, and the upper part is made to carry out advance movement of the rod object 37 to the amount beta of displacement in the subsequent range of 90 degrees - 180 degrees. After that, in the range to 270 degrees, stop the rod object 37 and retreat movement of the rod object 37 is further carried out caudad to the amount 0 of displacement in the subsequent range of 270 degrees - 360 degrees. Then, the cam curve is set up so that the range of 90 degrees of the following rotation may repeat operation which stops the rod object 37.

[0036] Movement of the rod object 37 with such a cam curve makes it one movement of advance movement of the rod object 37 and the retreat movements produced by turns to each stay period of the 1st cam mechanism 32 generated intermittently one by one so that clearly from the cam diagram of drawing 6 .

[0037] Of course [without being limited to the above-mentioned plate cam 36] as the 2nd cam mechanism 35, you may apply which cams, such as other plane cams and solid cams, for example, a grooved cam, an end cam, a cylinder rib cam, a cylinder grooved cam, a cone end cam, a cone grooved cam, a barrel-shape grooved cam, a hard drum form grooved cam, and a roller-gear cam.

[0038] As shown in the turret 34 of the 1st cam mechanism 32 of the above at drawing 1 - drawing 4 , an output shaft 40 is perpendicularly formed in the rotation center position to the input axis of rotation 31. The other end penetrates ceiling side 30c of a housing 30, and this output shaft 40 extends to the method of outside while the end is connected with a turret 34.

[0039] If it furthermore explains to a detail, 30d of openings is formed, the lower edge which is 30d of this opening will be made to project to the method of the inside of the direction of a path along with the hoop direction to ceiling side 30c of housing 30, and ring-like flange 30e will be formed in it at it. And 30d of this opening is equipped with the hollow cylinder object-like sleeve 41. The upper-limit outside periphery of the cylinder object-like sleeve 41 is made to project to the method of the outside of the direction of a path along with the hoop direction, flange 41a is formed in it, this flange 41a puts on flange 30e in 30d of openings from the upper part, these flange 41a and flange 30e are concluded with a bolt 42, and a sleeve 41 is fixed to housing 30. Into the sleeve 41 of the shape of this hollow cylinder object, an interval is separated from the upper-limit opening to the shaft orientations of a sleeve 41 with the ring-like spacer 43 between soffit flanges, and couple wearing of the ring-like bearing 44 is carried out. And the output shaft 40 which extends from a turret 34 side to the method of the outside of housing 30 is supported by these bearing 44 free [rotation] while it is inserted into a sleeve 41. In addition, it is equipped with the ring-like sealant 45 between the spacers 43 and output shafts 40 which are located in upper-limit opening of a sleeve 41. And oscillation movement of the 1st cam mechanism 32 is transmitted, and rocking rotation of this output shaft 40 is carried out according to it.

[0040] Thus, clutch equipment 46 is formed in the edge side which extended to the method of the outside of the housing 30 of the output shaft 40 attached in housing 30 free [rotation]. This clutch equipment 46 has the disk 48 as an output member in which relative rotation is possible to the barrel 47 as an input member prepared in the output shaft 40, and this barrel 47, and it is constituted so that it may be intermittent according to the load generated between these barrels 47 and a disk 48.

[0041] the cylinder-like member 49 which diameter reduction section 40a whose diameter was reduced in a completely different class is formed in the portion which extended to the method of the outside of the housing 30 of an output shaft 40, and surrounds the output shaft 40 concerned in this diameter reduction section 40a as shown in drawing 1 and drawing 7 if it explains in full detail -- a key -- a member 50 is fixed in one This cylinder-like member 49 is further equipped with the barrel 47 as an input member in one on the outside. While meeting the upper-limit section side at the hoop direction, making it project outside in this barrel 47 more and forming outside flange 47a in it, the lower retainer 52 of the shape of a ring which supports the soffit of the coil spring 51 mentioned later is attached in the soffit section. On the other hand, outside a barrel 47, it is formed in the shape of [which encloses a side side from the undersurface side] a drum, and the up retainer 53 which has inner flange 53a by which the upper limit of a coil spring 51 is stopped is further formed in the inner circumference veranda at the circumference of flange 47a. And surrounding an output shaft 40, these retainers 52 and the coil spring 51 with which it is equipped among 53 are constituted so that reaction force may be taken to the lower retainer 52 and the up retainer 53 may always be energized upwards.

[0042] on the other hand -- the upper part of a barrel 47 -- outside flange 47a -- from the upper part -- piling up -- an output -- the disk 48 which is a member is formed This disk 48 is the arrangement put by the cylinder-like member 49 and the barrel 47 from the upper and lower sides, and as it encloses the cylinder-like member 49, it is prepared, and between this disk 48, the cylinder-like member 49 concerned, and a barrel 47, bearing 54 is interposed, respectively. Therefore, the disk 48 is attached in the circumference of an output shaft 40 possible [relative rotation] to the

cylinder-like member 49 and barrel 48 which it is prepared in an output shaft 40 in one, and are rotated with this. And on the disk 48 constituted in this way, the table 55 of a major diameter is formed in this in piles, and both are concluded with a bolt 56. In addition, hole 55a for carrying out penetration projection of the output shaft 40 including the cylinder-like member 49 is formed in the center section at the table 55.

[0043] Thus, outside the constituted disk 48 and a barrel 47, between flange 47a and the up retainer 53, along with the hoop direction of the circumference of an output shaft 40, an interval is separated to outside flange 47a, and two or more notch 47b is formed in it, and it is equipped with the cylinder object-like rolling element 57 free [rotation] at these notch 47b, respectively. Moreover, it is made to correspond to this notch 47b, and pocket 48a which ****s in the cylinder side upper part of a rolling element 57 is formed in the undersurface of a disk 48. Especially, this pocket 48a is formed in respect of the taper which inclined along with the relative hand of cut of the barrel 47 of the circumference of an output shaft 40, and a disk 48, and holds a rolling element 57 free [engaging and releasing]. Moreover, along with the relative hand of cut of a barrel 47 and a disk 48, rolling slot 53b is annularly formed in the up retainer 53 at the notch 47b lower part of outside flange 47a. And when a rolling element 57 is formed with the outer-diameter size which may be held in these pocket 48a and notch 47b and secedes from pocket 48a, it is projected from notch 47b in a lower part, and rolls along with this in rolling slot 53b of the up retainer 53.

[0044] By the way, the formation position of notch 47b and pocket 48a corresponding to this makes in agreement the revolution angle alpha given by the 1st cam mechanism 32 mentioned above, is set up, and is set as the revolution angle alpha given when an output shaft 40 generally carries out the division of the period (360 degrees) rotated one time by the number of times S of indexing. In this example, as shown in drawing 7 (A), the case where the revolution angle alpha is 90 degrees is shown, therefore it is set as four places at intervals of 90 degrees.

[0045] Explanation of the operation of clutch equipment 46 shows the connection state of clutch equipment 46 to drawing 7 (B) as a torque-transmission state. The load generated between a barrel 47 and a disk 48 is small, therefore the energization force from a cartridge of a coil spring 51 makes the up retainer 53 contact the undersurface of flange 47a outside a barrel 47. and -- the state of illustration where a rolling element 57 is held in notch 47b of outside flange 47a, and pocket 48a of a disk 48, and is held -- an input -- the barrel 47 which is a member, and an output -- the disk 48 which is a member is connected in one through a rolling element 57 Therefore, it is in a connection state, the rotation torque of an output shaft 40 is transmitted to a disk 48 through a barrel 47, and clutch equipment 46 rotates a disk 48, as a result a table 55 in one with an output shaft 40.

[0046] Next, the separation state of clutch equipment 46 is shown in drawing 7 (C) as a torque cut off state. If a load from which a disk 48 will be controlled, for example if a big load occurs between a disk 48 and a barrel 47 is added The rolling element 57 held between notch 47b of flange 47a outside pocket 48a of a disk 48, and a barrel 47 It is pushed on the barrel 47 which is going to continue rotation in response to the rotation torque from an output shaft 40 to the controlled disk 48, and it secedes from concerned pocket 48a along the taper side of pocket 48a, resisting the energization force from a cartridge of a coil spring 51, and depressing the up retainer 53. Thereby, clutch equipment 46 is cut. And a rolling element 57 is in the state put between the disk 48 and the up retainer 53 by the energization force from a cartridge of a coil spring 51, the inside of rolling slot 53b of the up retainer 53 will be rolled, rolling within notch 47b, consequently the barrel 47 will carry out relative rotation to the controlled disk 48. During this period, while it will be in a separation state and a barrel 47 rotates with an output shaft 40, transfer in the disk 48 of the rotation torque of an output shaft 40 is intercepted, and a table 55 suspends clutch equipment 46. That is, when the load exceeding the set load set as the coil spring 51 occurs between a disk 48 and a barrel 47, a rolling element 57 will resist the energization force of a coil spring 51, it will secede from pocket 48a, clutch equipment 46 will come to be cut, and relative rotation with a barrel 47 and a disk 48 will occur in the revolution angle alpha which is the angle-of-rotation range which has seceded from the rolling element 57.

[0047] If a rolling element 57 is settled in the following pocket 48a as shown in drawing 7 (D) after that, on condition that the load between a disk 48 and a barrel 47 is below the set load of a coil spring 51, clutch equipment 46 will be connected, a torque-transmission state will be acquired again, and a disk 48 and a table 55 will rotate with an output shaft 40. At this example, since the revolution angle alpha is considered as a setup which is 90 degrees as mentioned above, as shown in drawing 7 , 1 time of a torque cut off state (clutch cutting state) is produced in [angle-of-rotation] 90 degrees.

[0048] thus, the intermittence operation is performed to the constituted clutch equipment 46 -- it should make -- close [its] and output -- operation which controls the load between the barrels 47 and disks 48 which are a member is performed by the 2nd above-mentioned cam mechanism 35 Along with the hoop direction, tooling-holes section 55b which the table 55 prepared in one is located in a disk 48, advances into it free [the lower part to an attitude of the rod object 37] on this table 55, and engages with it free [engaging and releasing] separates the interval of the above-mentioned revolution angle alpha above the rod object 37 with which the reciprocating movement is transmitted from

the 2nd cam mechanism 35, and is formed in it. And if advance movement is carried out by the 2nd cam mechanism 35 in the amount beta of displacement, the rod object 37 tooling-holes section 55b of a table 55 -- being engaged -- the movement -- controlling -- thereby -- an output -- the load by the side of the disk 48 which is a member being increased, and, while functioning as a clutch operation means to separate clutch equipment 46 and to operate it It will function as a positioning means to hold the position of the table 55 currently engaged exactly. On the other hand, when maintained by the 2nd cam mechanism 35 in the position of the amount 0 of displacement, the rod object 37 has seceded from tooling-holes section 55b of a table 55, and does not generate any load with the rod object 37 concerned in a table 55, as a result a disk 48 by this, either, but, thereby, controls clutch equipment 46 in the connection state.
[0049] while the input axis of rotation 31 will rotate to 90 degrees in rotation of 360 degrees of one rotation of the input axis of rotation 31 as shown in the cam diagram of drawing 6 if an operation of the above composition is explained -- the 1st cam mechanism 32 -- the revolution angle alpha (indexing angle) -- on the other hand, the rotation to ** is outputted The 2nd cam mechanism 35 is making the position of the amount 0 of displacement suspend the rod object 37 by the dwell at this time. This does not generate a big load to clutch equipment 46, therefore in the state of connection, a rotation drive is carried out in one and, on the other hand, a barrel 47 and a disk 48 rotate a table 55 for clutch equipment 46 to ** on the revolution square alpha with an output shaft 40.
[0050] Next, if the input axis of rotation 31 is in the period rotated to 90 degrees - 180 degrees, the 1st cam mechanism 32 enters during the stay, not outputting rotation but maintaining the revolution angle alpha by the dwell. Under the present circumstances, a table 55 also stops. In this halt position, in this state, according to the cam curve of the 1st cam mechanism 32, tooling-holes section 55b of a table 55 is located above the rod object 37 by position indexing of the revolution angle alpha, and the 2nd cam mechanism 35 will carry out advance movement of the rod object 37 upwards in the amount beta of displacement, and the rod object 37 advances into tooling-holes section 55b, and engages with a table 55. And this engagement state is maintained from the 2nd cam mechanism 35 stopping by the dwell after that, and the rod object 37 maintaining the amount beta of displacement, and being suspended.
[0051] Next, if the input axis of rotation 31 is in the period rotated to 180 degrees - 270 degrees, the 1st cam mechanism 32 outputs the rotation to the opposite direction of return on the revolution square alpha, and makes a revolution angle 0 degree. The 2nd cam mechanism 35 is making the position of the amount beta of displacement suspend the rod object 37 by the dwell at this time. To clutch equipment 46, a big load occurs by this, therefore clutch equipment 46 will be in a separation state, and relative rotation will generate it between a barrel 47 and a disk 48. Namely, while an output shaft 40 returns and rotating, as for a table 55, an engagement operation of the rod object 37 is also stopped conjointly in the position of the revolution angle alpha.
[0052] Next, if the input axis of rotation 31 is in the period rotated to 270 degrees - 360 degrees, the 1st cam mechanism 32 enters during the stay, not outputting rotation but maintaining 0 degree of revolution angles by the dwell. In this stay period, the 2nd cam mechanism 35 will carry out retreat movement of the rod object 37 to a lower part in the amount beta of displacement, the rod object 37 secedes from tooling-holes section 55b, is returned to the position of the amount 0 of displacement, and clutch equipment 46 is connected. And this secession state is maintained from the 2nd cam mechanism 35 stopping by the dwell after that, and the rod object 37 maintaining the amount 0 of displacement, and being suspended. And since the 1st cam mechanism 32 does not output rotation, any rotation torque is not transmitted to a table 55, either, but during this stay period is maintaining the idle state.
[0053] Thus, while an output shaft 40 continues oscillation movement transmitted from the 1st cam mechanism 32, a table 55 will repeat control operation and rotation operation, and will be carried out [intermittent rotation] by this by intermittence control of clutch equipment 46 with the rod object 37. And with the cam curve of the 1st cam mechanism 32, and the rod object 37 which it drives [object] to the 2nd cam mechanism 35, engages [object] with a table 55, and makes this control, position indexing in the case of this intermittent rotation will be secured exactly, and, thereby, can obtain intermittent indexing movement of a positive motion. If it is furthermore in this example, since notch 47b of the barrel 47 which constitutes clutch equipment 46, and pocket 48a of a disk 48 are made in agreement with the revolution angle alpha, the intermittence operation of this clutch equipment 46 itself can deduce, and it can be carried out now in a position, therefore can deduce also with this clutch equipment 46, and a position can be held appropriately. That is, in this example, the arrangement angle alpha of notch 47b and pocket 48a of the revolution angle alpha of the 1st cam mechanism 32 and clutch equipment 46 and the arrangement angle alpha of tooling-holes section 55b of a table 55 are altogether in agreement, and a very high position indexing precision is acquired.
[0054] In this example, a table 55 will perform rotation to which only the revolution angle alpha is sent out on the other hand to ** to an output shaft 40 performing oscillation movement of 1 round trip in one rotation of the input axis of rotation 31. Moreover, the 2nd cam mechanism 35 will transmit one movement of advance movement for the engagement to a table 55, and the retreat movements for secession to the rod object 37 by turns in 2 times of each stay period of the 1st cam mechanism 32 in one rotation of the input axis of rotation 31. And if it is in this example which

made the revolution angle alpha 90 degrees, intermittent rotation is carried out at a time at 90 degrees, and a table 55 is carried out one revolution by four rotations of the input axis of rotation 31.

[0055] If it is in the intermittent indexing equipment of this example explained above, by the way, fundamentally It is constituted using a machine element called the cam mechanisms 32 and 35 which can create a positive stay state and can obtain the positive motion of the whole movement easily and certainly by the dwell. From intermittent oscillation movement obtained by the 1st cam mechanism 32 Intermittent rotation is taken out by intermittence of the clutch equipment 46 controlled by the rod object 37. In this intermittent rotation, it deduces in engagement operation to the table 55 of the rod object 37 further, a position is held, and intermittent indexing movement of a positive motion can be rationally obtained with high degree of accuracy.

[0056] And the short machine element of the term of a guarantee of operation like the brake gear in the former can be eliminated, a mechanism can be constituted, and maintenance-free equipment can be obtained.

[0057] Moreover, the position indexing precision of a table 55 is essentially secured in a high precision by the cam curve with which the 1st cam mechanism 32 is equipped, and can prevent completely the unnecessary surroundings of the table 55 in which position indexing was further carried out by this cam mechanism 32 with the rod object 37. Therefore, the influence of the secular change in the brake gear used in order to make indexing operation certain in the conventional mechanism can be eliminated, and positive-motion operation by which precision was stabilized extremely highly can be guaranteed semipermanently.

[0058] moreover, the rocking angle-of-rotation range of oscillation movement with the cam curve in the 1st cam mechanism 32 -- a limit -- there is nothing -- therefore, oscillation movement of the angle range of 180 degrees or more -- ******** -- things are also made

[0059] Moreover, since it was made to make the rod object 37 accept and exercise in the any 1 direction of advance and retreat by turns to the stay period of each time of the 1st cam mechanism 32 by the 2nd cam mechanism 35 On the other hand, the 1st cam mechanism 32 at the time of rotation to ** A table 55 rotates by fixed rocking angle of rotation to an output shaft 40 and one by connection of clutch equipment 46. during the other period Intermittent rotation to one direction of having stopped by the stay period of the 1st cam mechanism 32 and cutting of clutch equipment 46 can be acquired, and this can be made to perform intermittent indexing movement.

[0060] Furthermore, according to movement of the 1st cam mechanism 32, oscillation movement can always be performed, and a table 55 can perform intermittent rotation according to intermittence control of clutch equipment 46 simultaneously with it, and an output shaft 40 can make two kinds of these movements output on the same axle from the single input axis of rotation 31 and an output shaft 40, as mentioned above.

[0061] Moreover, in the above-mentioned example, although the rod object 37 is accepted in the any 1 direction of advance and retreat by turns to the stay period of each time of the 1st cam mechanism 32 and it was made to make it exercise, control of the rod object 37 over the stay period of the 1st cam mechanism 32 is not restricted to this. The 2nd cam mechanism 35 is received about a setup of intermittent indexing movement. Produce movement which advances to ** on the other hand at least in one which the 1st cam mechanism 32 makes of stay periods, and it is made to stop during a fixed period. You may make it create the cam curve which is made to produce movement which retreats to opposite direction at least in one stay period of subsequent, and is stopped during a fixed period. Thereby, the 2nd cam mechanism 35 will produce reciprocating movement which moves in the any 1 direction at least during [one] the stay of the 1st cam mechanism 32, and intermittent indexing movement obtained by this will become various.

[0062]

[Effect of the Invention] As explained to the detail above, according to invention concerning a claim 1, by driving a clutch operation means by the 2nd cam mechanism, and carrying out intermittence control of the clutch means, an output member can be made to produce control operation and rotation operation repetitively, and intermittent rotation can be acquired from oscillation movement of the 1st cam mechanism. And by the cam curve of the 1st cam mechanism, and clutch operation means to drive to the 2nd cam mechanism, to engage with an output member, and to make this control, position indexing in the case of this intermittent rotation can be secured exactly, and, thereby, can obtain intermittent indexing movement of a positive motion.

[0063] Since it constituted using a machine element called the cam mechanism which can create a positive stay state and can obtain the positive motion of the whole movement easily and certainly by the dwell especially Intermittent rotation can be taken out from intermittent oscillation movement obtained by this cam mechanism by intermittence of the clutch equipment controlled by the clutch operation means. In this intermittent rotation, it can deduce in engagement operation to the output member of a clutch operation means further, a position can be held, and intermittent indexing movement of a positive motion can be rationally obtained with high degree of accuracy.

[0064] And the short machine element of the term of a guarantee of operation like the brake gear in the former can be eliminated, a mechanism can be constituted, and maintenance-free equipment can be obtained.

[0065] moreover, an output -- the output in which the position indexing precision of a member was essentially secured in a high precision by the cam curve with which a cam mechanism is equipped, and position indexing was further carried out by this cam mechanism -- the surroundings with an unnecessary member can be completely prevented by the clutch operation means Therefore, the influence of the secular change in the brake gear used in order to make indexing operation certain in the conventional mechanism can be eliminated, and positive-motion operation by which precision was stabilized extremely highly can be guaranteed semipermanently.

[0066] moreover, the rocking angle-of-rotation range of oscillation movement with the cam curve in a cam mechanism -- a limit -- there is nothing -- therefore, oscillation movement of the angle range of 180 degrees or more -- ******** -- things are also made

[0067] According to invention concerning a claim 2, at the time of rotation to the one direction of the 1st cam mechanism moreover, by connection of a clutch means An output shaft and one can be made to rotate an output member by fixed rocking angle of rotation. during the other period it stops by the stay period of the 1st cam mechanism, and cutting of a clutch means -- it can make -- an output -- a member -- on the other hand, intermittent rotation to ** can be acquired, and intermittent indexing movement can be obtained by this

[0068] According to invention of a claim 3, oscillation movement which always follows movement of the 1st cam mechanism can be made to be able to perform, intermittent rotation can be made to be able to perform to an output member according to intermittence control of a clutch means simultaneously with it, and two kinds of these movements can be made to output to an output shaft on the same axle from the single input axis of rotation and an output shaft especially furthermore.

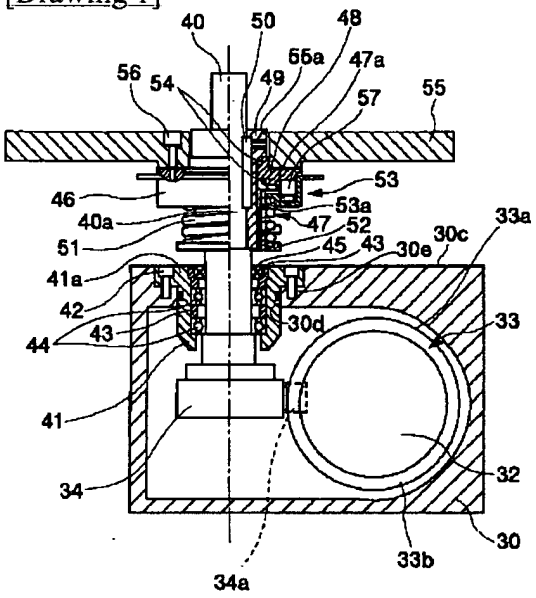
[Translation done.]

* NOTICES *

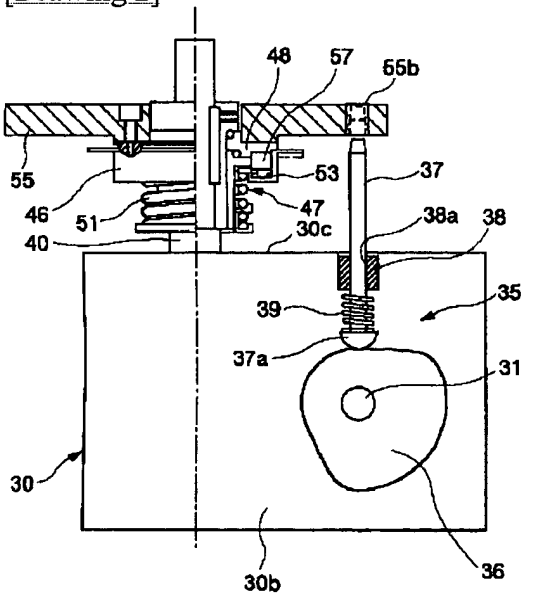
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

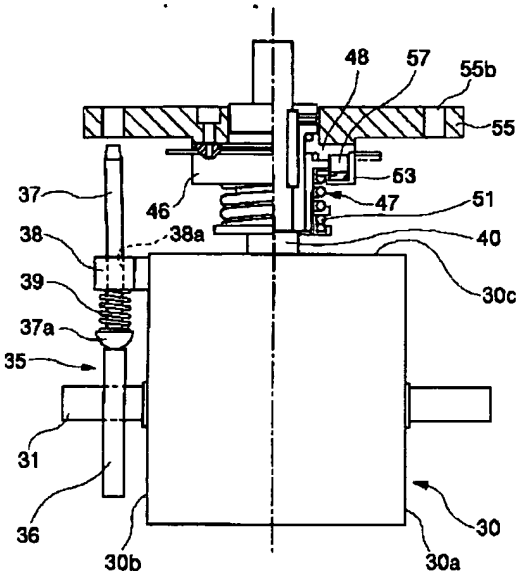
[Drawing 1]



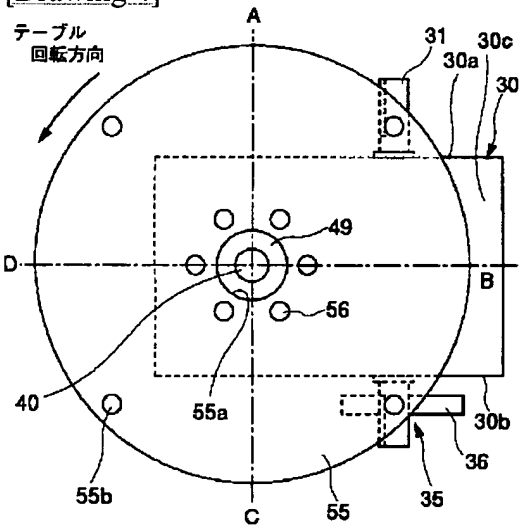
[Drawing 2]



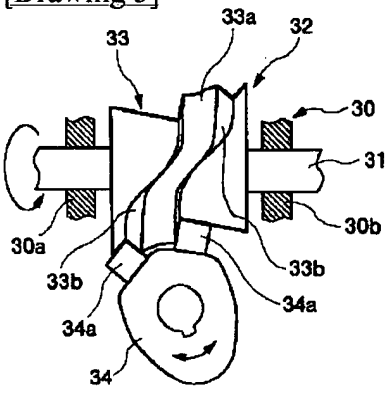
[Drawing 3]



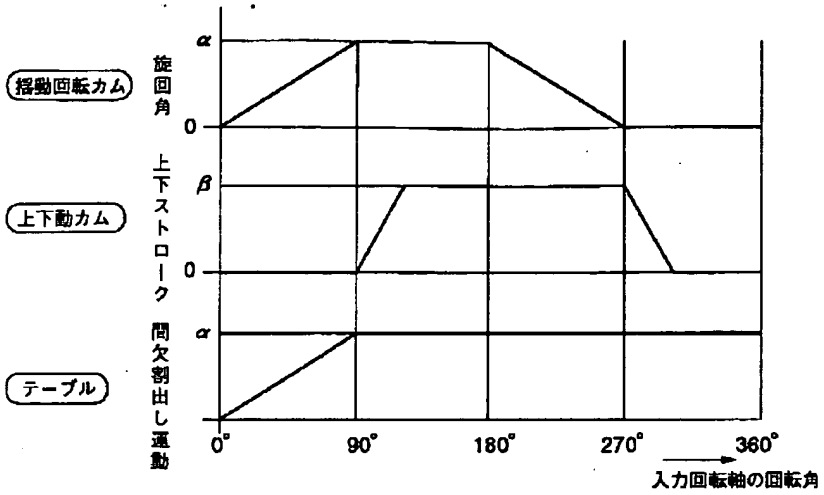
[Drawing 4]



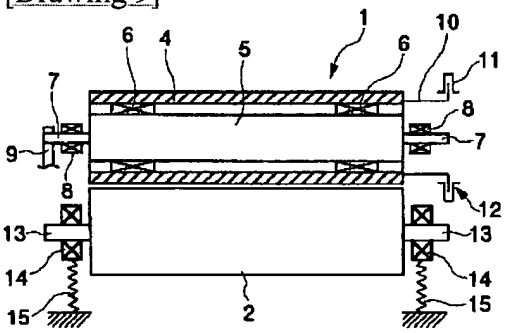
[Drawing 5]



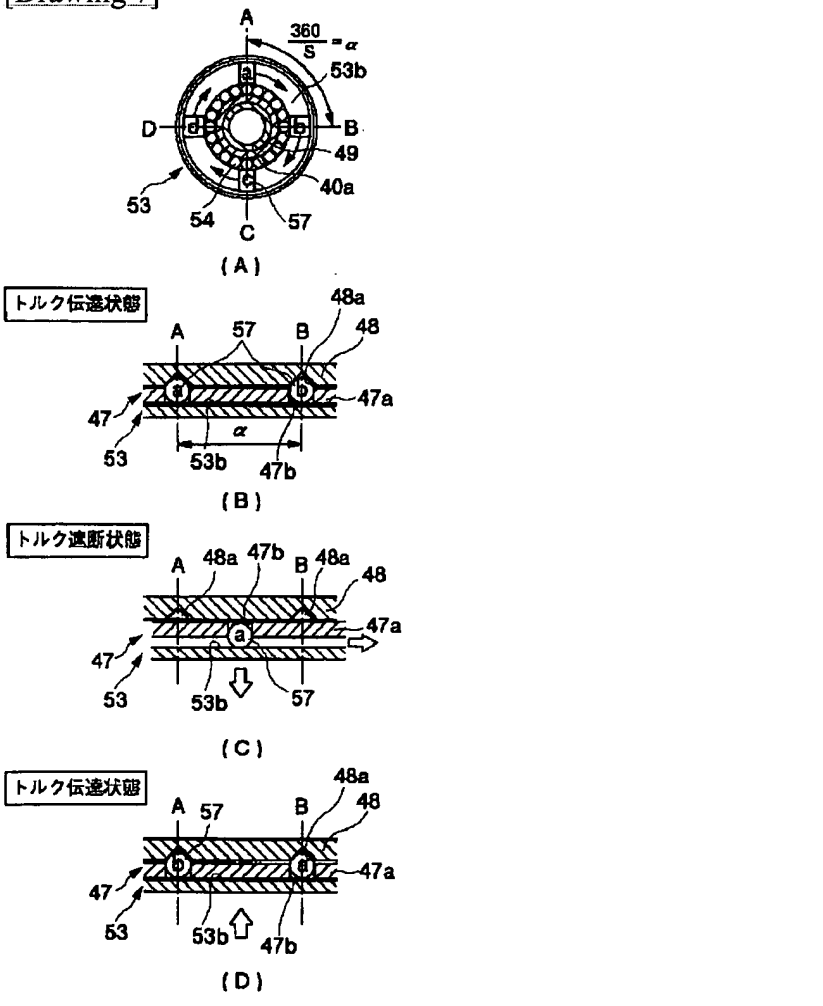
[Drawing 6]



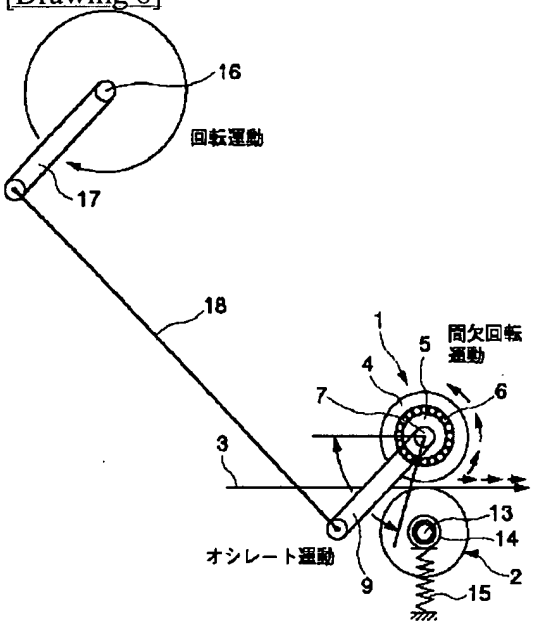
[Drawing 9]



[Drawing 7]



[Drawing 8]



[Translation done.]